ON THE ASSOCIATION OF EPILEPSY WITH MUSCULAR CONDITIONS FITTING BEST INTO THE CADRE OF THE MYOPATHIES.*

BY ONUF (ONUFROWICZ), M. D.,
OF SONYEA, N. Y.

The cases to be reported here are of interest, not only by the clinical combination mentioned in the title which they presented, but also by the manner in which they were discovered. It was intended to study in a dozen male cases of idiopathic epilepsy the blood and gastric functions. To establish the idiopathy, a negative process had naturally to be resorted to, —namely, exclusion of all those factors that would make, or even tend to make, a case non-idiopathic, such as: natal, or other cerebral traumatism, organic diseases of the nervous system in general, alcoholism, the symptomatic convulsions of Bright's disease, and others which it is needless to mention here. Suffice it to say that although the search was made among the best—i.e. most intelligent class of patients of the Craig Colony—comprising the study of over fifty histories, yet by the "weeding" process applied in order to exclude all those in which there was more or less suspicion of non-idiopathic factors, the number of available cases dwindled down to fourteen, which after a superficial examination (without stripping the patients) seemed to fill the requirements of their ensemble, seemed to most properly belong among the idiopathy. Closer examination proved, however, that six of these fourteen cases showed muscular conditions which in their ensemble, seemed to most properly belong among the myopathies, although they presented some features deviating from the usual attributes of this disease group.

Of the histories of these cases preceding their examination, by myself, I present the principal facts. These were gained partly from the admission papers of the patients, partly from notes by members of the medical staff of the Colony, for which the writer here expresses his indebtedness.

On the development and direct[1] heredity of the muscular conditions mentioned, definite data were elicited by the writer only in two cases (I and VI), in both of which the family character of the disease seemed well established, or at least very probable from the statements obtained. In Case V no reply was received to a detailed letter of inquiry comprising the points mentioned. In the remaining three cases (II, III, IV) letters of inquiry of the same character were answered in such an unintelligent manner that the information obtained proved worthless. The patients themselves were unable to give any data in this respect. All cases were males.

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[1] Meaning the presence of the same muscular conditions in blood relatives.

HISTORIES.

Case I.—R. P. Cl., aged twenty-three, admitted to the Craig Colony, August 23, 1904.

Family History.—No neurotic heredity so far as known, except that one brother has "wing scapulæ" like patient.

Personal History.—Born at full term. No birth traumatism.* Dentition began at 3½ months, was difficult and accompanied by convulsions, the first one at age of 6 months. Has had epileptic seizures ever since, occurring at intervals of six weeks to four months, more severe now (i.e., time of admission) than formerly. Mostly nocturnal. Yells in seizures, bites cheek, but does not wet bed. Aura: cold feeling in precordium, passing to head. Excited prior to seizures, and depressed after.

No mental deterioration.

Patient's lumbar lordosis and wing scapulæ were noticed by father at age of about fourteen or fifteen, the genu recurvatum about the same time. Onset was gradual.

Examination March 1, 1905.—Patient shows distinct wing scapulæ, more apparent on left side. Infraspinatus flattened on both sides. Lumbar lordosis of rather marked degree. No flatfoot. Deltoids seem somewhat undersized as compared with other muscles. Left deltoid is decidedly smaller than right and decidedly undersized as compared with other muscles.

Reflexes.—Knee-jerks: absent without reinforcement, subnormal with reinforcement.

Ankle-jerks: both good and equal. Deep reflexes of upper extremity present but not increased.

Plantar reflex: chiefly toe flexion and thigh type; equal on both sides.

Cutaneous sensation: normal everywhere; also deep sensation.

Electric reactions.—Faradic response: diminished in left deltoid, upper right trapezius, and right serratus as compared with other side.

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*Parents say that head was misshapen at birth, and that the attending physician "moulded" it back into shape, and they think that this "moulding" may have caused some injury to the brain. But there never was any paralysis.

Galvanic response: sluggish in left infraspinatus.

No change in formula. Deltoids respond equally.

Hearing better in right ear than in left.

Thoracic and abdominal organs and circulation normal.

Urine: 5.8 oz. in 24 hours, orange yellow. Specific gravity 1022 Reaction acid. Microscopically some squamous epithelia. No albumin. No sugar.

Mentally patient is bright: one of the most intelligent patients at the Colony; a rapid calculator; helps in the laboratory where all kinds of work requiring considerable intelligence and trustworthiness is well performed by him.

Summary of examination.—Wing scapulæ, particularly marked on left side, with flattening of infraspinatus. Lumbar lordosis, slight genu recurvatum. Lessened volume of left deltoid, anterior portion; also upper part of right trapezius and in right serratus magnus. Galvanic response diminished in right infraspinatus. Normal sensation. Patient a very intelligent one.

On March 1, 1905, at about 8:15 a.m., patient evidently had a grand mal seizure. He was seen by the writer at 8:20 a.m. with a bruise of the left cheek, i. e. a hematoma about the size of a crab-apple, and slight excoriations of the skin over it. He was sitting on a chair, leaning his head on his hands. He behaved like a heavily drugged or heavily intoxicated person. Look was glassy, speech thick, slurring.

Q. "Who am I?" No reply.

Q. "Where are you now?" A. "Sitting on a chair."

Q. "But what place is this?" A. "A room; here the stone floor, a chair."

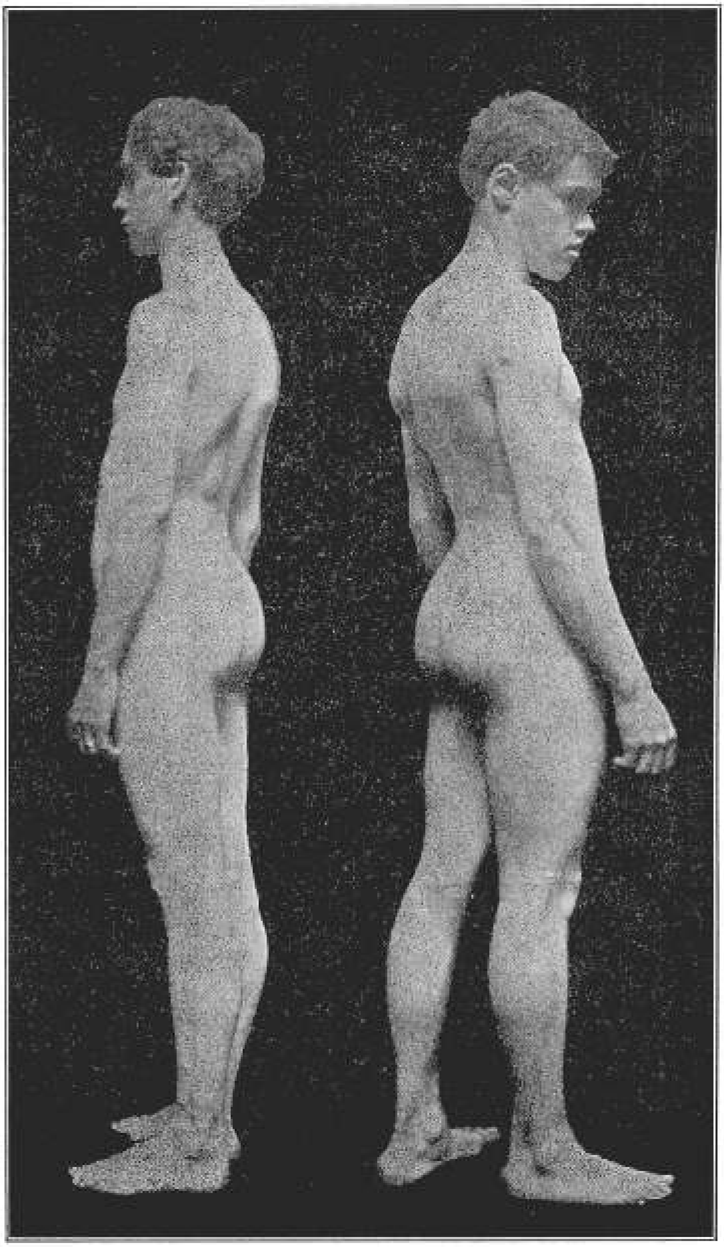
Q. "What house is that over there?" A. "Can't tell; can't think of his name. Wait, wait; no, can't think of it."

Patient evidently tries hard to give answers, seems to feel badly because he cannot give them. Asked, "What is the matter?" he says, "I feel sick."

Head is flushed, pulse rather tense. Tongue not bitten.

About 8:35 a.m. he can give the name of the man living in the house above mentioned (the gardener, Goodman), but does not know the name of the laboratory attendant, Mr. Hemstrot. Names the writer correctly. Says he remembers all the questions asked by the writer, but could not answer them. Gives evidence by repeating most of these questions, that he actually does remember them. Remains in a slightly stuporous condition for about fifteen minutes longer, altogether about thirty minutes from time first seen.

Case II. A. H., aged eighteen, admitted to the Craig Colony, July 12, 1904.



CASE I **CASE II**

Family history. Father epileptic and intemperate. Maternal grandfather died from cerebral hemorrhage. Mother was frightened on the night before the patient's birth.

Personal history. No birth traumatism. No convulsions during dentition. Good physical, fair mental development. No history of traumatism of any kind.

Epilepsy began at the age of fifteen. First seizure followed a fright. Aura consists in several partial flexions and extensions of both elbows; after that becomes unconscious. Seizures of grand mal type. Attacks first came on once a month; at present every ten days.

Concerning the development of the muscular anomalies described below, the only information obtained was as follows: "Relating to the deformity of patient, will say it must have come upon him gradually, as he was not born that way, to our knowledge."

Examination, Feb. 21, 1905. Perhaps somewhat undersized; dark hair and eyelashes; rather strongly built; some lordosis of lumbar spine. Scapulae stand off at lower angles somewhat. Flat-footed on both sides.

Ears; markedly reddened, lobules broad and adherent; lacking in strength.

Face; flushed and freckled.

Palate; high and narrow.

Skull shows transverse saddle in region of coronary suture.

Abdomen; appears unusually dark as compared with rest of body. No thyroid enlargement.

Heart action; slow, about 66 per minute. Otherwise O. K.

Pulse; small.

Lungs apparently emphysematous at apices, where percussion sound is very sonorous.

Spleen and liver not enlarged.

Urine, 48 oz. in 24 hours, yellow, acid. Spec. grav. 1014. No albumin, no sugar. Microscopically, some squamous epithelia.

Linear scars over forehead. A few superficial scars (atrophic) over chest and back, reminding somewhat of past specific affection.

No enlargement of cervical glands, nor epitrochlear, nor inguinal.

Nervous System. Motor power in lower extremities not noticeably impaired; at least, not in leg muscles, excepting flatfoot. The lordosis disappears in a sitting position. Movements of muscles of upper extremities show no distinct diminution in power. Serratus muscle shows good action, but slightly more on right side than left.

No incoördination of upper extremities.

Gait shows no disturbance.

Reflexes. Knee-jerk and ankle-jerk present and equal; not exaggerated.

Deep reflexes of upper extremities not elicitable.

Plantar reflex of toe flexion and thigh type.

Cremaster reflex lively on right, moderate on left side. Abdominal reflex the reverse.

Epigastric reflex present.

Cutaneous sensation normal everywhere; posture—also.

Ocular movements normal.

Vision normal on both sides.

Mental response very slow, but not showing any marked defects otherwise.

Electrical Examination. Faradic response stronger in left infraspinatus (which is slightly flatter than its fellow) than in the right one.

Galvanic response: An. C. C. > Ca. C. C. in right deltoid muscle, and response is sluggish as compared with other muscles. (The right deltoid is somewhat fuller than the left. Patient is right-handed, but other muscles of right upper extremity are not more voluminous.)

Summary of Examination. Congestion of face, particularly ears. Flat-footed on both sides. Lordosis of lumbar spine, disappearing in sitting position, and suggestion of wing scapulae (the lower angle stands off.) No muscular atrophies or hypertrophies. Reversal of galvanic formula in right deltoid. Increased faradic response in left infraspinatus. No noticeable motor weakness in the groups concerned.

Knee jerks and ankle jerks present.

Slow heart action (66). Otherwise thoracic and abdominal organs normal.

Intelligence fair, but mental processes markedly slow.

Case III. L. J. Co., aged 16, admitted to the Craig Colony, March 4, 1901.

Family History. Mother nervous. Father had sick-headaches. Paternal ancestors tuberculous.

Personal History. Labor was "very severe." (Another statement says "prolonged.") Delivery natural. No birth injury noted. No convulsions immediately after birth. Had measles and whooping-cough. "Worm fits" at age of 2 (four convulsions.) At age of 8, after riding in sun, had a severe convulsion. Epilepsy dates since then. Had as many attacks as eight and nine in one day. Aura: choking sensation, sometimes nausea or cough. Light attacks seem to be aborted by swallowing salt.

Admitted to the Craig Colony, March 4, 1901.

March, 1902, mild diphtheria attack.

October, 1902, erysipelas of head.

Examination, February 21, 1905. Head broad and large, bulging somewhat in temples, and suggestive of hydrocephalus. Complexion and hair light. Stature tall.

Hands covered with numerous white spots looking like scars seen on blacksmiths.

Hard palate well shaped.

Teeth well shaped, especially the lower incisors, with exception of a slight notching in latter.

Several scratches on right forehead from recent seizure. Tongue shows no scars.

Thyroid gland not enlarged.

Abdominal organs; nothing abnormal except slight right inguinal hernia.

Urine: 41 oz. in 24 hours, yellow, acid. Spec. grav. 1018. Microscopically, squamous epithelial cells. No albumin, no sugar.

Motility of lower extremities shows nothing abnormal except double flat-foot.

Upper extremities: scapular muscles poorly developed as compared with other muscles, and decidedly reminding of wing scapulæ. Inner border stands off and is remote about width of examiner's hand from spine; lower angle also standing off.

Dynamometer; right hand 80; left hand 84.

Reflexes. Knee-jerks equal and normal. Ankle-jerks sluggish, weak, and equal.

Plantar reflex of Babinski type on both sides.

Left cremasteric lively; right weak.

Epigastric and abdominal reflexes present.

Electric examination. Reversal of galvanic formula in left deltoid and in facial muscles of both sides, direct and indirect.

Sensation: no disturbance of cutaneous or deep sensation; all qualities tested. Testicles not hypo-algetic.

Ocular movements normal. Pupils equal and normal; react to light and accommodation.

Vision normal on both sides.

Hearing normal.

Sense of taste normal.

Mentally fairly bright. His general information, in view of general education, good.

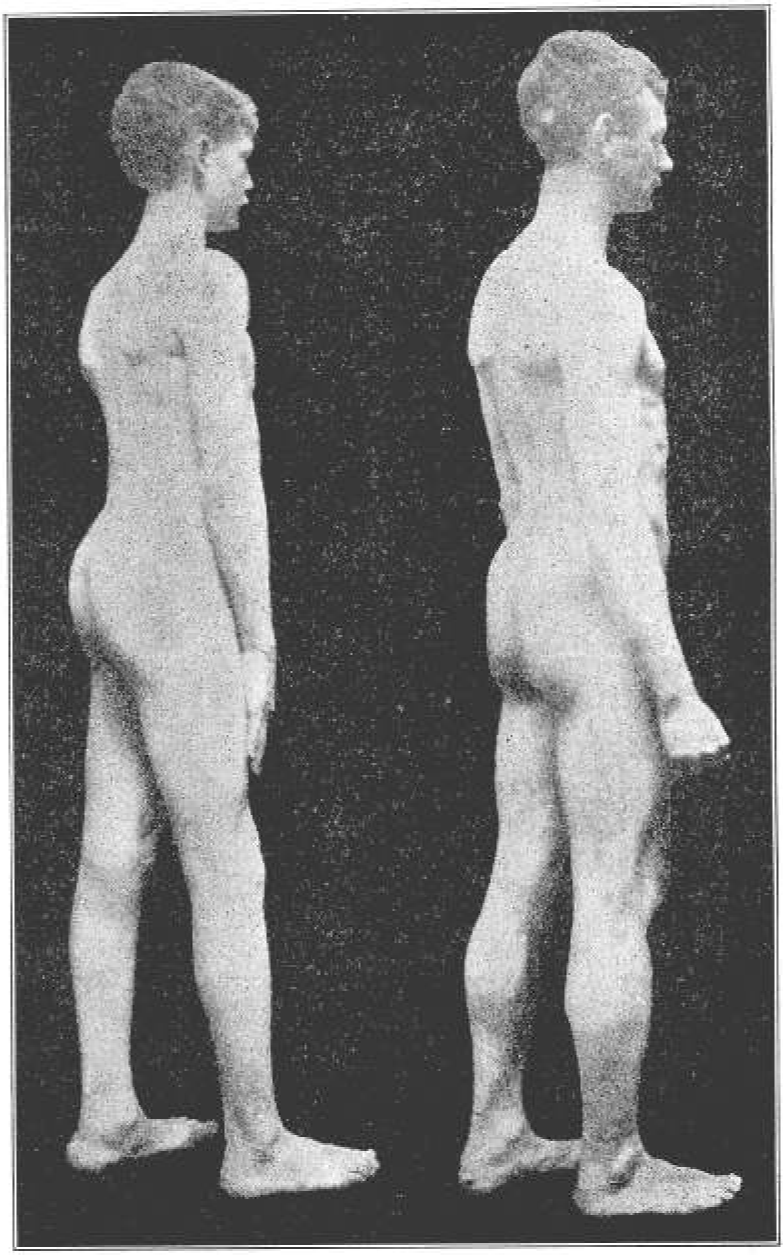
Summary of examination. Large, broad head, bulging somewhat in temples. (hydrocephalus (?)). Flat-foot, lumbar lordosis, and suggestion of wing scapulæ. Babinski type of plantar reflex. No marked (definite) muscular weakness corresponding to regions concerned (lordosis, etc.). Reversal of galvanic formula in left deltoid and in muscles of both sides of face.

Fair intelligence.

Case IV. M. J. O'., aged 29, admitted to the Craig Colony, December 19, 1902.

Family history. No neurotic heredity.

Personal history. Full term birth. Normal labor and delivery. Whooping-cough at 8 years. Dentition without convulsions. Frequent attacks of nose bleed between ages of 18 and 20. No injuries. Epilepsy began at age of 6, "acted as if brought on by



CASE III

CASE IV

worms." Seizures consist in loss of consciousness, convulsion and foaming at the mouth. Very weak when coming to. No aura. Severe and mild seizures. Attacks occur about every week.

A scoliosis was noticed in patient but it was thought it came from the attacks.

No other information was obtainable regarding the muscular conditions present.

Examination, February 27, 1905. Patient medium-sized man, rather slender build.

Ears well-shaped, but lobules small.

Upper incisors protruding considerably, the lower incisors directed backward, causing prognathism of upper jaw.

Heart action and sounds normal, except occasional reduplication of second sound over left ventricle. No enlargement.

Pulse 72, soft in character.

Lungs nothing abnormal. Clear vesicular murmur everywhere.

On palpating spleen a gurgling sound is heard on pressure with every expiration.

Urine, 45 oz. in 24 hours, orange yellow, acid. Spec. gravity, 1017. No albumin; no sugar. Microscopically squamous epithelial cells.

Liver and spleen not palpable.

Left naso-labial fold deeper on left side of face, showing in general stronger innervation than right. Cannot whistle; puffs out cheeks defectively. Fibrillary twitchings in right orbicularis oris.

His right scapula sometimes lower than left. When lower there is a distinct scoliosis of upper dorsal spine, with concavity to right. Right shoulder is lower, entire right scapula seems smaller than left, though this may be due to stronger development on right side of upper trapezius, supraspinatus and infraspinatus muscles. Left scapula stands off considerably on inner border and lower angle.

Dynamometer: Right, 127; left, 115.

Slight vibratory tremor of hands; otherwise motility of upper extremities is not disturbed.

Flat-foot on both sides. The right leg, thickest portion of calf, about 2 cm. smaller than left.

Gait and station, nothing abnormal.

Power of leg muscles good. After some standing shows decided lordosis, though not marked.

No evidence of spasticity of movements of upper extremities.

Electrical Examination. Direct faradic response slightly stronger in muscles of right side of face. The left naso-labial fold is deeper. No galvanic change in facial or other muscles.

Reflexes. Knee-jerks fairly lively on both sides.

Ankle-jerks good and equal on both sides.

No ankle clonus.

Biceps, triceps and radius' reflex present on both sides and fairly active.

Plantar reflex of toe flexion type on both sides, and slight.

Cremasteric reflex slight on right and practically absent on left, but on left side the test for the reflex produces contraction of left abdominal muscles. This in less degree present also on right side.

Abdominal reflex rather slight on both sides.

Epigastric reflex fair.

Cutaneous sensation: Tactile sense normal everywhere, but pain sense rather dull in general. Temperature sense normal.

Deep sensation not disturbed anywhere.

Skin; marked varicosities on right calf; long linear scar over chest in front; rather strong acne on back, moderate on face.

Vision 10-10 on both sides, no contraction of visual fields.

Sense of taste. It is so difficult to make patient comprehend the conditions of test that reliable data cannot be obtained.

Olfactory sense. Test used, ammonia, spirits of camphor, oil of cloves, oil of wintergreen. Patient says every time, "Cannot tell what it is," then adds, "Thought I smelled ammonia."

Ocular movements normal.

Pupils equal; reaction good.

Mental condition, oriented as to date and place.

General information deficient and comprehension slow.

Summary of Examination. Marked prognathism; flushed face. Asymmetry in facial innervation. Fibrillary twitchings in right orbicularis oris. Flat-footed; slight lumbar lordosis; right scapula lower than left; right upper trapezius, supra- and infraspinatus muscles flattened. Some muscular scoliosis of upper dorsal spine, concavity to right. Direct faradic response in muscles of left side of face weaker than right. Slowness of mental grasp. Defective general cerebration. Nothing abnormal on part of sensory examination, nor of heart, lungs, liver and spleen.

Case V. G. H. S., aged fifteen, admitted to the Craig Colony Aug. 23, 1904.

Family History. Three maternal aunts died from tuberculosis. Mother had slight headaches (from endometritis [?]). Patient an illegitimate child (?) cared for by foundling society in New York.

Personal History. Born at full term. No birth traumatism. No convulsions during dentition and infancy. When learning to walk had some difficulty in using right leg. Measles and pertussus at age of eleven months. Convulsions for two months with measles, and bleeding from ear and nose at same time. Scarlet fever at sixteen months, diphtheria at two years. Epilepsy said to date from age of 12. First seizure: Vertigo, then loss of vision, falling to ground and becoming unconscious for thirty minutes. No cause assigned. Seizures continued every six or eight hours for two days. Three weeks later had other seizures. At time of admission average about once a week and nocturnal. Formerly both night and day attacks. Used to wet bed in seizures. No aura.

Examination, Feb. 28, 1905. Patient shows marked pes valgus, lumbar lordosis, and standing off of lower angle and inner border of scapulæ. Right shoulder drooping; slight lordosis of upper dorsal spine, with concavity to the right. Lumbar lordosis disappears in sitting position. Right supraspinatus is decidedly, though not markedly, flatter than left. Can stand on tiptoe, but not well on heels. No difficulty in climbing chair. Extensors of hip are weaker than flexors. However, diminution of power not distinctly evident otherwise. Shows some degree of genu recurvatum.

Reflexes. Knee-jerks present and equal, rather sluggish; otherwise not distinctly diminished with reenforcement.

Deep reflexes of upper extremity not elicitable.

Power of deltoid muscles decidedly diminished, and these muscles look decidedly wasted as compared with other muscles.

Electric Examination. Faradic response stronger in left deltoid in lateral portion than right; anterior portion, the opposite.

Galvanic response in right deltoid is decidedly sluggish, and An. C. C. $>$ Ca. C. C.

(Facial innervation at times stronger on left side than on right.)

Urine, 55 oz. in 24 hours, orange yellow, acid. Spec. gravity 1020. No albumin, no sugar. Microscopically squamous epithelial cells.

Summary of Examination. Flat-foot, genu-recurvatum, lumbar lordosis, incipient wing scapulæ; some wasting and diminished power of deltoids; reaction of degeneration in deltoids. Some asymmetry of facial innervation.

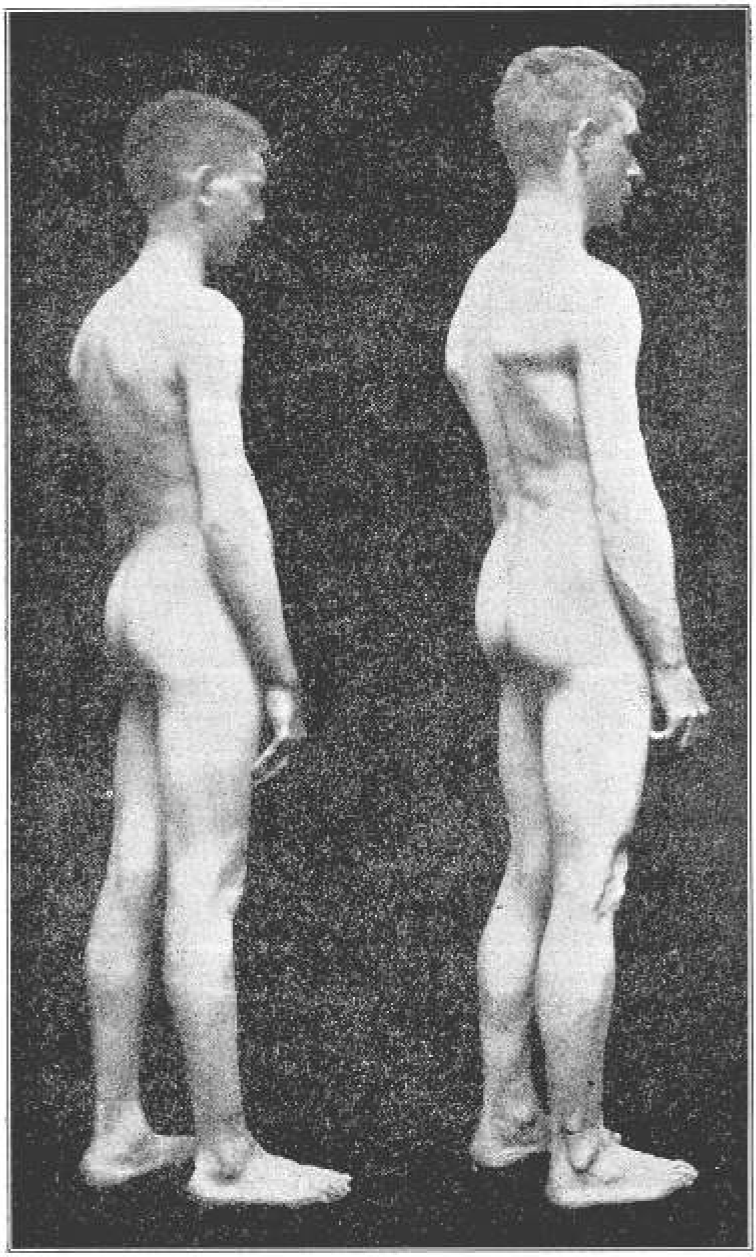
Case VI. H. D. G., aged twenty-three. Admitted to the Craig Colony March 6, 1900.

Family History. Father and paternal father were inebriates. Paternal grand-aunt and grand-uncle were insane. One brother had infantile paralysis. Paternal aunt committed suicide.

Patient's sister was "very round-shouldered at one time. She went to the gymnasium and she stands very straight now, but her shoulders protrude very hard. She has a deep hollow between them, so you can notice it very plainly when she has a thin waist on. She is very much like patient—tall and slim—but in good health."

A maternal uncle of patient "had the same curve in his back" (lumbar lordosis) as patient.

Personal History. Measles at age of eighteen months, complicated with ulceration of left cornea and followed by complete loss



CASE V CASE VI

of vision of that eye. Had convulsions for about ten days after measles, but after that had no more "fits" until age of eleven, when he began to have "fainting spells." At thirteen first grand mal attack, after which unconscious for several hours. No aura. Maniacal at times.

In a letter of inquiry directed to patient's mother, attention was called to the wing scapulæ, the lumbar lordosis (not very pronounced), and the flat-foot which patient shows. Questioning regarding the onset of these conditions elicited the reply: "He never complained of his back until after the age of fourteen years, after the attacks commenced. Seven or eight years ago Dr. Keegan circumcised him, and said he was as perfect a man as he ever saw. His feet were all right as long as I cared for them."

During stay at Colony, once (Feb. 12, 1900) ran away, freezing some toes. Nothing said about character of seizures at Colony.

Examination Feb. 25, 1905. Patient fairly well-nourished man of dark complexion and hair; of fair muscular development; the scapulæ standing off somewhat at lower angle and inner border, the left one slightly (1½ inches) higher than right, and the inner border about 2 inches further from spine than that of left side. The supraspinatus and infraspinatus on that side decidedly flattened. Shoulders sloping. Flat-footed on both sides. Lumbar spine seems slightly lordotic. Right large toe was amputated at distal joint.

Dynamometer Test. 95 on either side.

When patient holds hands extended in front of him and against each other, and the hands are forcibly drawn apart, the standing off of scapulæ becomes quite marked, as does the lumbar lordosis. This takes place only on attempt of drawing arms apart, showing thus weakness of serrati magni.

Patient can stand well on tiptoes, but not so well on heels.

Aside from conditions mentioned, no muscular atrophies are seen.

Reflexes. Knee-jerks equal, normal.

Left ankle-jerk present; right absent.

Deep reflexes of upper extremities quite active, not distinctly exaggerated.

Cutaneous reflexes; plantar on left side of Babinski type; on right side difficult to judge on acount of amputation of toe.

Cremasteric reflex weak on left, absent on right.

Abdominal and epigastric reflexes present and equal on both sides.

Cutaneous sensation; localization and temperature sense excellent everywhere; responses very prompt.

Pain sense good everywhere except in testicles, which are practically entirely analgesic.

Deep sensation good everywhere.

Electric reactions: serrati magni act equally on both sides; infraspinatus stronger on right than on left side. Reversal of galvanic formula in both deltoids.

Left cornea shows an anterior staphyloma. Iris is almost entirely adherent to cornea. Phthisis bulbi.

Right eye: Pupil shows reaction to light and accommodation.

Motility normal.

Face. Region of left cheek somewhat sunken, but left nasolabial fold deeper than right.

Ears stand off a little, lobules adherent.

Palate only slightly arched, broad. On opening mouth wide, uvula retracts entirely into soft palate.

No thyroid enlargement.

Heart action is not increased

Pulse 68 per minute, soft in character.

Heart-sounds normal.

Some asymmetry of thorax, the left side being somewhat saddled in left lower part; border of ribs slightly turned out.

Lungs, spleen and liver show no abnormalities.

Urine, 36 oz. in 24 hours, orange yellow, acid. Spec. gravity 1034. No albumin, no sugar. Microscopically squamous epithelial cells.

Mental faculties. Very prompt in tests made on him (sensory, etc.); also shows no sluggishness in replies generally, but his general information deficient.

Summary of Examination. Phthisis of left eye. Rachitic thorax. Flat-foot. Slight lumbar lordosis. Suggestion of wing scapulæ. Flattening of right and left infra- and supraspinatus muscles. Reversal of galvanic formula in both deltoid muscles. Absence of right ankle-jerk. Normal sensation except analgesia of testicles.

DISCUSSION OF CASES.

Summing up, we find here a group of epileptics presenting partly muscular atrophies, partly defective muscular action without clearly demonstrable atrophy, with definite distribution of these disturbances, manifested on the whole as follows:

1. Wing-like standing off of the scapulæ, due apparently chiefly to weakness of the trapezius, possibly also serratus magnus, rhomboideus, and levator anguli scapulæ muscles.

2. Atrophies of the scapular muscles in a strict sense, namely, infra- and supraspinatus; also occasionally of the deltoids and other muscles of the shoulder joint.

3. Lordosis of lumbar spine in erect position, disappearing in sitting position, a phenomenon clearly explained already by Gowers in "Pseudo-muscular Hypertrophy" as due to weakness of

the extensors of the hip, causing an inclination of the pelvis forward and compensatory bending backward of the body.

4. Pes valgus.

5. Involvement of the facial muscles (two cases only).

6. Electrical changes manifested most frequently by a reversal of the galvanic formula, particularly in the deltoid muscles.

7. Fibrillary twitchings (two cases).

The said muscular symptom-complex was not present in all cases alike and in the same degree. In some cases the lordosis was chiefly developed, in others the wing scapulæ, and the flatfoot was present in all cases but one; the facial involvement was found in only two. Qualitative galvanic changes were found in at least 4 cases; fibrillary twitchings in two.

The classification of this symptom group is rather difficult. The distribution of the muscular disturbances conforms best with that of the myopathies, but the presence of qualitative electrical changes (reversal of the galvanic formula) found in at least four cases, and the presence in two cases of fibrillary twitchings, speak rather against it. However, Sachs[1] calls attention to the fact that fibrillary twitchings have been seen in some cases that appeared typical myopathies, and that the electrical reactions have been found considerably altered in similar cases. Therefore, the presence of these two disturbances (qualitative electrical changes and fibrillary twitchings) would not necessarily exclude the cases reported here from the class of the myopathies.

The presence or absence of the disease in other members of the family to which the patient belongs has been used for differential diagnosis; its presence being in favor of the myopathies, its absence in favor of the spinal form of muscular atrophy.

In this respect the information gained regarding the cases here reported is, unfortunately, very defective. In the two cases (I and VI) in which intelligent information was elicitable the family character of the disease seemed established.

Of interest is the association of the malady with epilepsy—an association which I have not found mentioned in any of the familiar text-books on nervous diseases. The interesting question arises whether a case of epilepsy thus complicated can be called idiopathic or not. If we have to deal with a spinal form of muscular atrophy, then it would be rather risky to consider the epilepsy as idiopathic. But if the muscular affection is to be classed among the myopathies, then the appellation "idiopathic" for the epilepsy may be permissible.

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[1] B. Sachs. "A Treatise on the Nervous Diseases of Children," 1895. page 406.

How many cases of epilepsy we shall still be allowed to call idiopathic, after careful examination and history, remains to be seen. But somehow, the more thorough the inquiry and examination the less becomes the percentage of cases to which the appellation "idiopathic" remains justifiable.

There is still one possibility to be discussed, namely, that of the muscular conditions being secondary to, *i. e.*, the effect of epileptic seizures.

Dr. Spratling has privately communicated to the writer a case in which a condition of muscular weakness and resulting attitude, associated with atrophies and quantitative electrical changes of certain muscles, was seen to develop after a series of severe epileptic convulsions, and which he therefore called epilepagenic myopathy.

Whether in the six cases above reported such an etiology and interpretation might be assumed cannot be decided offhand. However, on the whole, the similarity of the clinical picture with that of the genuine myopathies makes it more plausible to class them among the latter.

Dr. Pierce Clark, in a private discussion of the writer's cases, has suggested a possible casual connection with rickets. Future observations will have to show whether such a casual relation can be assumed. One of the patients (VI) showed a decidedly rhachitic thorax. In others, changes of the teeth, palate or skull were somewhat suggestive of rhachitis. This is about all that can be said on this point.